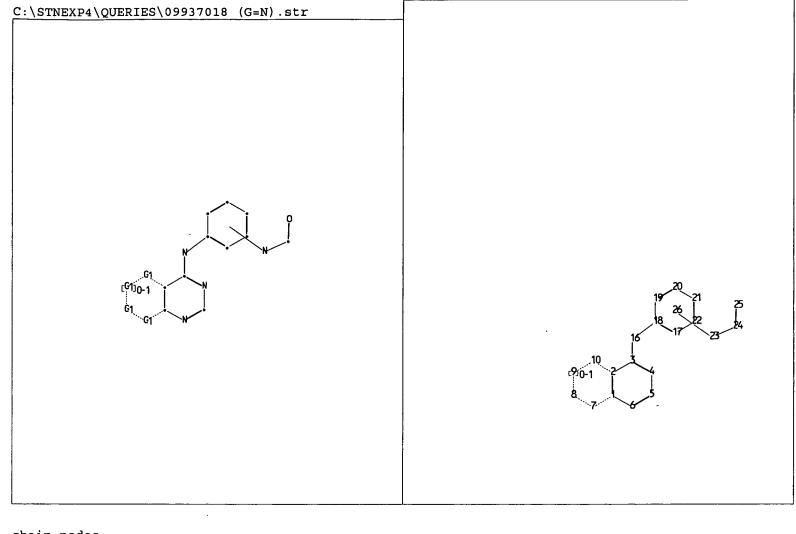
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		(544/279) or (544/280) or (514/234.2) or	EPO; JPO;	
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3	553	(((544/117) or (544/118) or (544/258) or	USPAT;	2003/09/23 10:43
		(544/262) or (544/278) or (544/277) or	US-PGPUB;	
		(544/279) or (544/280) or (514/234.2) or	EPO; JPO;	
		(514/260.1) or (514/262.1) or (514/263.4) or	DERWENT	
		(514/264.11)).CCLS.) and (2002.py. or	1	
		2003.py.)		



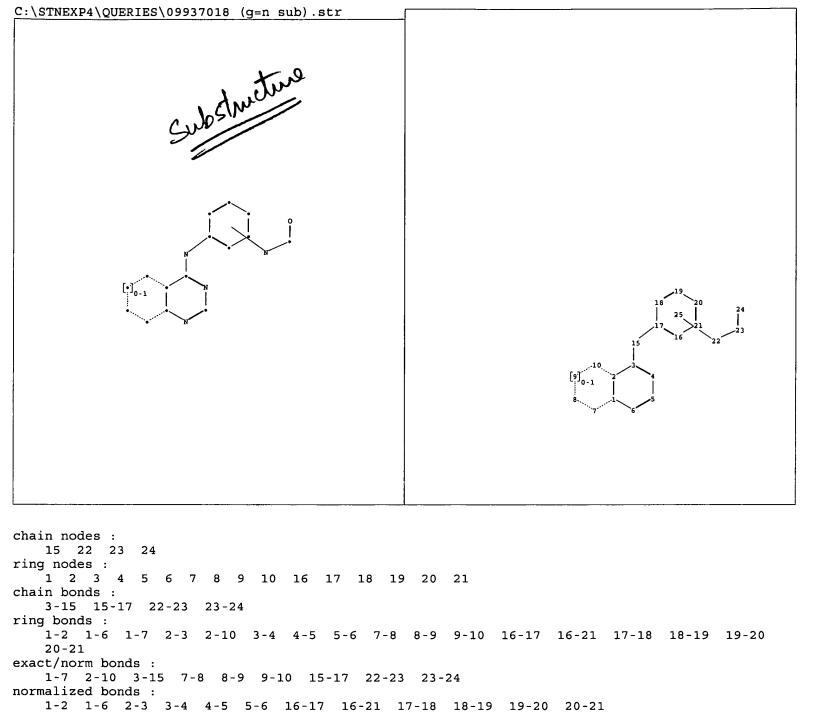
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chain nodes :
   16 23 24 25
ring nodes :
   1 2 3 4 5 6 7 8 9 10 17 18 19 20 21 22
chain bonds :
   3-16 16-18 23-24 24-25
ring bonds :
   1-2 1-6 1-7 2-3 2-10 3-4 4-5 5-6 7-8 8-9 9-10 17-18 17-22 18-19 19-20 20-21
   21-22
exact/norm bonds :
   1-7 2-10 3-16 7-8 8-9 9-10 16-18 23-24 24-25
normalized bonds :
   1-2 1-6 2-3 3-4 4-5 5-6 17-18 17-22 18-19 19-20 20-21 21-22
isolated ring systems :
   containing 1 :
G1:C,O,S,N
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1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 16:CLASS

17:Atom 18:Atom 19:Atom 20:Atom 21:Atom 22:Atom 23:CLASS 24:CLASS 25:CLASS

Match level :

26:CLASS



1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 15:CLASS

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isolated ring systems :
 containing 1 :

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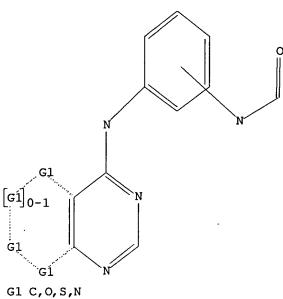
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53.4% PROCESSED 1000 ITERATIONS INCOMPLETE SEARCH (SYSTEM LIMIT EXCEEDED) SEARCH TIME: 00.00.01

FULL FILE PROJECTIONS: ONLINE \*\*COMPLETE\*\*

BATCH \*\*COMPLETE\*\*

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PROJECTED ITERATIONS:

34826 TO 40014

PROJECTED ANSWERS:

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3 ANSWERS

738 ANSWERS

L2 3 SEA SSS SAM L1

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FULL SCREEN SEARCH COMPLETED - 38128 TO ITERATE

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Ill Introductory Articles	Advanced Articles	Keynote Articles	Related Articles	NEW New Articles	full symbol key 🕶	
1.   Cytokines   Balkwill, Frances R  Cytokines are 'messenger proteins', soluble mediators that allow communication between cells. Together with hormones and neurotransmitters, they contribute to a chemical signalling language that controls development, tissue repair, inflammation and the immune response in multicellular animals.						
2.   Cytokines as Mediators of Disease  Balkwill, Frances R  Virtually all insults to the body involve cytokine responses, and nearly every type of disease has a cytokine component. An understanding of the cytokine component of diseases is leading to new approaches to treatment.						
Cyr, Richard J				processes ensure a stea	ady supply of new cells	
Dunn, Adrian J Several mechanisms may affect immune for	unction via direct inn utonomic nervous sy	s and immune syster ervation of immune stem. Cells of the im	organs, by secretion mune system may in	ve now been recognized of hormones from the p offluence nervous system ed.	pituitary and other	
5. Bacterial Cell Division Call Division Cal						
Nath, Indira Chronic infectious dis		caused by microorg	anisms that reside w	ithin phagocytes and ep T lymphocytes via cyto		
7. 🖹 Vaccines: DN	NA 🕾					

Immunization by injection of plasmids encoding foreign proteins has been used successfully as a research tool and to elicit

protective immune responses in animal models.

# 🗎 Vaccines: Presentation 🔠

Encyclopedia of Life Sciences

## Ertl, Hildegund CJ; Xiang, Zhi Quan; Pasquini, Susanna and K walczyk, Dariusz W

Different types of vaccine formulations selectively favour induction of the immune responses that correlate with protection to challenge with an infectious agent.

# 9. Acute-phase Proteins

## Gabay, Cem and Kushner, Irving

Acute-phase proteins form part of the systemic acute-phase response which accompanies inflammation. Their synthesis by hepatocytes is primarily regulated by inflammation-associated cytokines and their presumed functions are highly variable and diverse.

# 10. 🖹 Endothelial Cells: Immunological Aspects 🖾

### Mantovani, Alberto and Garlanda, Cecilia

Endothelial cells regulate the traffic and functions of leucocytes by expressing in a regulated way adhesion molecules and cytokines. They therefore engage in a complex bidirectional interaction with immunocompetent cells.

## 11. BHaematopoiesis B

#### Evans, Todd

Haematopoiesis is the process of forming blood cells, which occurs during embryogenesis and throughout normal life.

# 12. BImmunology of Invertebrates: Humoral B

### Gupta, Avodhva P

All major groups of invertebrates possess immunocytes that perform the major cell-mediated immune functions. During massive or prolonged microbial invasion, the cellular defence may be impaired. Under such circumstances, antimicrobial proteins (humoral factors) secreted by the host immune system provide the second line of defence.

## 13. BInterleukins

### Mire-Sluis, Anthony R

The interleukins are a group of proteins that have been classified specifically by a designated nomenclature committee of the International Union of Immunological Societies/World Health Organization. These proteins are derived, mainly, from white blood cells and act on white cells, although these criteria are not necessarily exclusive of other cell sources and activities. Interleukins, amongst other proteins, maintain the haematopoietic and immune systems, and control their functions.

#### 14. BInflammation: Chronic B

## Wakefield, Denis and Kumar, Rakesh K

Chronic inflammation may result from failure to eliminate an acute inflammatory irritant, from an autoimmune response to a self antigen, or may be caused by an innately chronic irritant of low intensity that persists. It is characterized by simultaneous inflammation and repair, with recruitment and activation of macrophages, lymphocytes and other cells triggered by the coordinated action of cytokines and growth factors.

#### 15. BImmunoregulation M

## O' Shea, John J and Nutman, Thomas B

The immune system serves essential functions in protection from numerous pathogenic organisms and, in general, is not harmful to the host. The process by which the immune response is restrained or controlled is termed immunoregulation. A number of different aspects of the immune system contribute to this process of immunoregulation, some of the most important being signals from antigen-presenting cells by costimulatory molecules, the effects of cytokines and apoptotic cell death.

## 16. B Lymphocytes 🕾

### Bondada, Subbarao and Chelvarajan, Ralph L

B (bone marrow-derived) lymphocytes are antibody-producing cells in the body. Antibody production is initiated upon

recognition of antigen via a specific immunoglobulin receptor,	and reception of growth and differentiation signals. B lymphocytes
are also important for activation of helper T lymphocytes and	are integral for the memory component of the immune response.

# 17. 🖹 Immune Response: Regulation 🖺

## Lukic, Miodrag L and Lukic, Aleksandra M

Early events in an immune response may determine the outcome of immunogenic stimulus, and molecules produced as part of an immune response – such as cytokines and antibodies – can feed back into, suppress or promote the response. Both underand overreaction to antigens may be deleterious, so the immune system requires control mechanisms at different levels so as to provide an optimal immune response at all times.

# 18. 🖹 Lymphocyte Responses In Vitro 🖺

# H dgkin, Philip Desmond

Lymphocytes can be stimulated in vitro to undergo many of the responses associated with antigen stimulation in vivo. The development of in vitro activation protocols has led to the identification of important cellular communication pathways and to a molecular description of lymphocyte function.

# 19. 🖹 Lymphocytes: Antigen-Induced Gene Activation 🖺

### Madrenas, Joaquín

Lymphocytes are generally activated upon antigen recognition by their clone–specific surface receptors. Lymphocyte activation includes multiple signalling cascades that converge in the cell nucleus to cause significant changes in the pattern of gene expression. These changes determine the cell phenotype and ultimately, the type of immune response.

# 

#### Bogdan, Christian

Macrophages are an important component of the innate and adaptive immune system. Their ability to recognize, phagocytose and kill microbial pathogens is complemented by the production of a broad spectrum of pro- and anti-inflammatory cytokines.

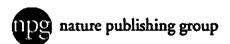
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(symbols)

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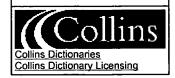
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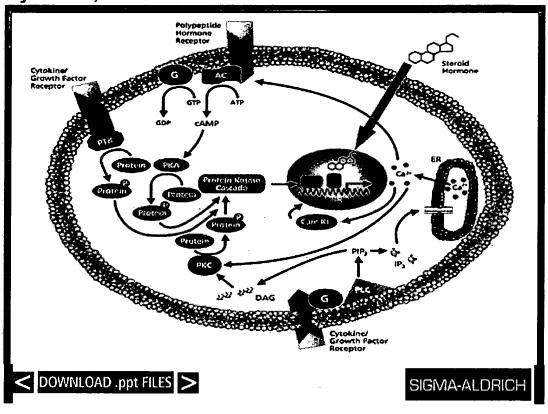
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# Cytokines, Growth Factors and Hormornes



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# Cytokines, Growth Factors and Hormones

Cytokines, growth factors (GF), and hormones are all chemical messengers that mediate intercellular communication. The regulation of cellular and nuclear functions by cytokines, growth factors, and peptide or protein hormones is initiated through the activation of cell surface receptors (Rc). All receptors have two main components: 1) a ligand-binding domain that ensures ligand specificity and 2) an effector domain that initiates the generation of the biological response upon ligand binding. The activated receptor may then interact with other cellular components to complete the signal transduction process. Many growth factors bind to receptors that are linked through G-proteins to membranebound phospholipase C (PLC). Activation of PLC cleaves phosphatidylinositol 4,5bisphosphate (PIP2) to form diacylglycerols (DAG) and D-myo-inositol-1, 4, 5trisphosphate (IP3). IP3 regulates intracellular Ca2+ by binding to the IP3 receptor on the endoplasmic reticulum (ER) and stimulating Ca2+ release from the ER. Free intracellular Ca2+ can bind to calmodulin, and this Ca2+-calmodulin complex, in the presence of cyclic-AMP (cAMP), activates protein kinase A (PKA) by binding to the regulatory subunit of the enzyme. DAG binds to and activates protein kinase C (PKC). Other hormone receptors may be linked through G-proteins to adenyl cyclase (AC) instead of PLC. Activation of AC increases the cellular levels of cAMP and, in the presence of the Ca2+-calmodulin complex, will activate PKA. Additionally, some growth factor and cytokine receptors are protein tyrosine kinases (PTK) that are directly activated by ligand-receptor interaction. Activation of any of the protein kinases, PKA, PKC, or PTK, catalyzes the phosphorylation of other

proteins within the cell. Enzymes that are activated or inhibited by phosphorylation may mediate functional processes within the cell, while others may be one step in a protein kinase cascade that regulates nuclear events.

Steroid hormones (i.e. estrogen, glucocorticoids), thyroid hormone, vitamin D3, and retinoids are all small lipophilic molecules that easily penetrate both the cellular and nuclear membranes to enter the nucleus where they bind to their respective receptors that are ligand-dependent transcription factors. These ligand-receptor complexes bind to specific DNA response elements in the promoter region and regulate gene expression.

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#### References:

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Marshall, C.J., Specificity of receptor tyrosine kinase signaling: transient versus sustained extracellular signal-regulated kinase activation. Cell., **80**,179-185 (1995).

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